TMENT OF THE INTERIOR
March 3, 1849

July–August–September 1955
Vol. 5 · No. 3

PROPERTY OF
Bureau of Land Management
DSC LIBRARY

Our PUBLIC LANDS

BUREAU OF LAND MANAGEMENT

July–August–September 1955 • Volume 5, Number 3

OUR PUBLIC LANDS . . .

500 million acres of land that belong to us and to our neighbors and to all the people of the United States . . . public lands that are rich in natural resources . . . timber, rangeland, water, minerals, and land for every use . . . "active acres" that must be carefully and wisely managed for the welfare of the Nation . . .

As a forum for the exchange of ideas and information on t development, utilization, and conservation of the resources o public lands, this periodical contains no copyrighted material. If pictures or material are reprinted, a credit line should be given Our Public Lands *and the Bureau of Land Management.*

Issued quarterly by

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Washington 25, D. C.

The printing of this publication has been approved by the Director of the Bureau of the Budget, January 26, 1954

DEPARTMENT OF THE INTERIOR
Douglas McKay, Secretary
BUREAU OF LAND MANAGEMENT
Edward Woozley, Director

BUREAU OF LAND MANAGEMENT ORGANIZATION

Director	Edward Woozley
Assistant Director	William G. Guernsey
Executive Officer	Depue Falck
Assistant to the Director	Earl J. Thomas
Information Officer	Mack C. Corbett
Associate Solicitor for BLM	James D. Parriott
Minerals Staff Officer	Lewis E. Hoffman
Cadastral Engineering Staff Officer	Earl G. Harrington
Forestry Staff Officer	Walter H. Horning
Lands Staff Officer	Harold Hochmuth
Range Management Staff Officer	Gerald M. Kerr
International Cooperation Officer	Byron C. Denny

AREA ADMINISTRATORS

Area I, James F. Doyle	Portland, Oregon
Area II, Neal O. Nelson	Salt Lake City, Utah
Area III, Westel B. Wallace	Denver, Colorado
Area IV, Lowell M. Puckett	Anchorage, Alaska

CONTENTS

ARTICLES

ACQUIRED LANDS COST GOVERNMENT $2.2 BILLION
by Karl S. Landstrom, Lands Office, BLM 3

SCATTERED TRACTS GO ON THE AUCTION BLOCK
by Russell Kifer *and* Harold Tysk, Denver Area Office, BLM . . . .

COOPERATION BUILDS A BRIDGE
by Virgil L. Hart *and* Leroy C. Sweet, BLM 6

EVOLUTION OF THE SOLAR TRANSIT
by Donald B. Clement, *Cadastral Engineering Officer*, BLM 8

COORDINATED LAND USE PLANNING
by Royale K. Pierson, *Range Officer*, BLM 9

ANCIENT IRAQ TRIES RECTANGULAR SURVEYING
by Clark L. Gumm, *Cadastral Engineer*, BLM 10

BEATING THE BARK BEETLE
by Archie D. Craft, *Forester*, Idaho State Office, BLM 16

MINERAL SURVEYS ARE DIFFERENT
by Earl G. Harrington, *Cadastral Engineering Staff Officer*, BLM 18

FEATURES

ACTIVE ACRES 14
- New Book on S & MC Engineering
- Why Sealed Bids?
- New Book on Lands
- BLM Explained to Scouts

UNSURVEYED AREAS OF U. S. REDUCED TO 100 MILLION ACRES 24

COVER

The seeming anachronism of a camel interfering with the instrument man's line of sight in modern-day cadastral surveying serves to depict another far-flung frontier of the Bureau of Land Management, namely, the introduction of America's system of rectangular su veying in Iraq. Clark L. Gumm, BLM cadastral engineer, tells about it with skilled p and camera on pages 6–9.

88065738

ACQUIRED LANDS COST GOVERNMENT $2.2 BILLION

by KARL S. LANDSTROM, Lands Office, BLM

RECOGNIZING that the Federal Government was without an inventory of its real estate holdings, the U. S. Senate Committee on Appropriations, in 1953, asked the General Services Administration to initiate such an inventory. This was done, and the first inventory report was published in April 1955 (S. Doc. No. 32, 84th Cong., 1st Sess.).

The inventory covers all land, buildings, and other structures and facilities within the continental United States, title to which is in the United States or Government corporations.

The report shows, as of December 31, 1953, that 24 Federal agencies and corporations held 11,493 installations involving 405.1 million acres of land. he land area owned by the Federal Government approximately equal to the area of all the States east of the Mississippi River, excepting Kentucky, Tennessee, Mississippi, and Alabama.

The total of 405.1 million acres includes 346.6 million acres (85.6 percent) of public domain lands, 46.3 million acres (11.4 percent) of purchased lands, and 12.2 million acres (3.0 percent) of donation, exchange, and transferred lands.

An additional area of 56.0 million acres, mainly Indian reservations, are held in trust by the Federal Government.

The report for the first time brings together information on the total extent and cost of real estate acquired by the Federal Government other than the public domain. Information on the extent and disposition of the public domain lands has long been made available to the public by the Department of the Interior. As of December 31, 1953, the Federal Government held 58.5 million acres of acquired lands, which had cost $2.2 billion.

The Federal Government owns land in every State, ranging from approximately 18,000 acres each in Connecticut and Rhode Island, to over 61 million acres in Nevada, in addition to about 11,000 acres in the District of Columbia.

In the eleven Western States, there are 359.1 million acres of Federal land, comprising 88.7 percent of the total of Federal lands in continental United States, and also 47.7 percent of the total nd area of this group of States. The percentage of the total land area in these Western States that is owned by the Federal Government ranges from approximately 30 percent in Montana and Washington to 87.4 percent in Nevada.

Of the total of 405.1 million acres of Federal land, 380.6 million acres (94 percent) is under the control of two agencies, namely, Interior and Agriculture. The Department of Defense controls another 5 percent, with only 1 percent for all other agencies. The two most prominent land administering agencies are the Bureau of Land Management (179.8 million acres), and the Forest Service (168.3 million acres).

The 405.1 million acres of Federal land has been subdivided into categories according to the predominant usage of each installation, excluding Indian and other trust lands. The following tabulation shows acreage of the major land usage categories and percent of the total acreage:

Land usage	Acres (millions)	Percent
Forest and wildlife	186.3	46.0
Grazing	169.6	41.9
Military (except airfields)	15.2	3.7
Parks and historic sites	15.0	3.7
Reclamation and irrigation	8.8	2.2
Flood control and navigation	3.2	.8
Airfields	2.0	.5
Other usages	5.0	1.2
Total	405.0	100.0

There were 428,786 Federal buildings, costing $14.4 billion and containing a gross floor area of 2.2 billion square feet, as of December 31, 1953. There were, in addition, Federal structures and facilities costing $13.6 billion. The principal usage categories of structures and facilities were power development, utility systems, roads and bridges, and flood control and navigation.

It has been recognized that inventories, in order to be of value, must be maintained on a current

(Continued on page 19)

SCATTERED TRACTS GO ON THE AUCTION BLOCK

by **RUSSELL KIFER** and **HAROLD TYSK**, Denver Area Office, BLM

IN DISPOSING of more than a billion acres of public lands, the Federal Government has followed a long-established policy that the initiative rests with the individual.

This position was not a wholly passive one, for the lands were surveyed to provide a means of locating and identifying tracts, and land openings were announced, but the land offices acted only after applications had been filed.

Numerous tracts of less desirable land—areas deemed submarginal for agriculture—have remained in Federal ownership, however, as settlers bypassed them for the better lands, leaving "islands" in the "seas" of privately owned holdings.

The Bureau of Land Management has recently taken the initiative, however, in disposing of these isolated and scattered tracts that are not required for public purposes and probably can serve a higher use if absorbed by the privately owned lands which surround them.

This new and common-sense move to "block up" land ownerships where spatterings of public domain lands cannot be economically administered by the Government is being undertaken in the Missouri Basin more or less as a pilot program. The history of the public land pattern that led to this decision is interesting and somewhat typical.

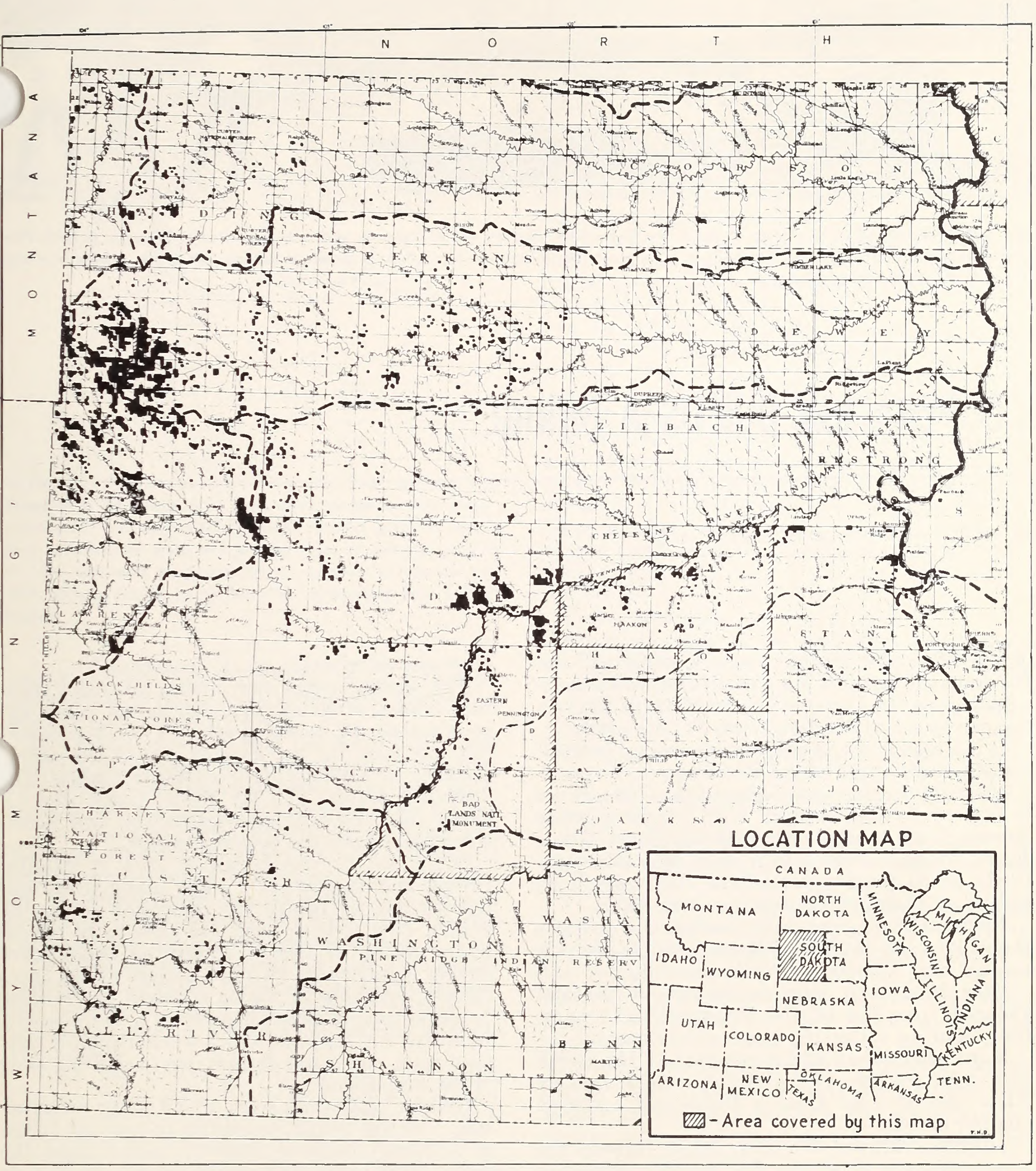
Of approximately 340,000,000 acres of land in the Missouri River drainage, obtained for the most part by the Louisiana Purchase, some 20,000,000 acres remain as vacant unreserved public lands. In addition to these public domain lands, sizable areas are reserved for special uses. About 16 million acres remain in public forests under the jurisdiction of the Forest Service. Other areas, totaling about 5 million acres, are included in the National Park System, wildlife refuges, and in reclamation or other withdrawals. The 15 million acres lying within Indian reservations are included in tribal allotments, are allotted to individuals, or are held in trust for Indians. These are not public lands subject to disposal.

In the early stages of the settlement and development of the Basin, the disposal of public lands was a means to encourage agricultural political, and economic development of the ne empire. Large areas of public land were transferred to the State through grants for education and other purposes. Land grants were made to encourage the construction of transcontinental railroads. The homestead laws transferred much of the remaining public land to private citizens for farms and homes. Other important public land laws under which the land was alienated include the Kincaid Act of 1904, the stock raising Homestead Act of 1916, the enlarged Homestead Act and public sale laws.

Irrigation was fostered by grants of land for development by the States and by individuals. The Desert Land Act, passed in 1877, provid tracts of 320 acres for development under irri tion. The Carey Act, passed in 1894, grante tracts of desert land to States for irrigation and development. Later, other areas were reserved for development by the Bureau of Reclamation and eventually disposed of to settlers. This development continues.

In general, the era of wholesale disposal ended soon after World War I, and because the productivity of the great marginal areas fell short of the hopes of the settlers, the trend to agricultural settlement was reversed and land patented for crop production reverted to its best long-time use, grazing. With the passage of the Taylo Grazing Act in 1934, the remaining public lands came under active supervision and management. Although the land was not closed to appropriation, disposal was made subject to approval by the Secretary of the Interior. The act established grazing districts for the management of contiguous areas of remaining public land and for the leasing for grazing of other areas not included within the grazing districts.

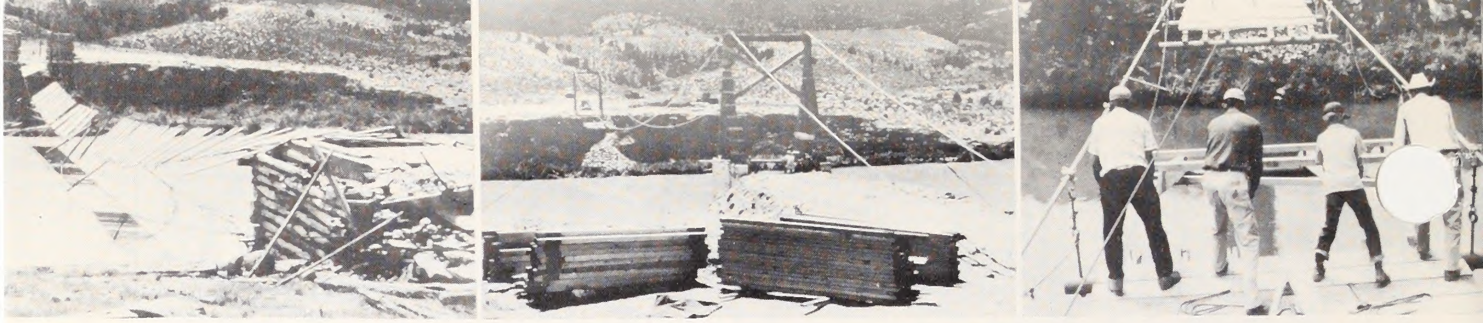
Public lands could still be appropriated under any of the existing public land laws on classification by the Secretary of the Interior. The initiative, however, rested wholly with the prospective entryman. Public land was made available whe suitable for a purpose and when consistent wit public interest, but only when action was taken



TYPICAL. Western South Dakota is fairly typical of the areas in the Missouri Basin where privately owned lands isolate and dwarf the comparatively small residue of public domain lands—shown in solid black. These tracts will be among the first to be auctioned off in BLM's new voluntary disposal program.

the individual to enter or purchase particular tracts. The act provided also for exchanges of Federal lands with the States to consolidate holdings of Federal and State lands, for exchanges of Federal land with private persons for the same purpose and for the selection by States of lands due under their land grants which, because of prior disposal or reservation for public purposes, had not been transferred to the States. The Federal Government did not, however, adopt an aggressive program for disposal.

(Continued on page 20)



THE OLD AND THE NEW. Spanning of the Green River, chief tributary of the Colorado, with a new suspension bridge at Brown's Park is photographed by the authors, step-by-step. The old bridge, unusable since 1950, is shown at extreme left. The crossing is a vital link in moving cattle between ranges.

COOPERATION BUILDS A BRIDGE

by **VIRGIL L. HART** and **LEROY C. SWEET, BLM**

A SHINY new bridge, planned, surveyed, and designed by the Bureau of Land Management, spans the Green River at Brown's Park in the extreme northwestern corner of Colorado.

It is a monument to cooperation among private, county, State and Federal interests.

The only permanent crossing of the Green River in the remote area between U. S. Highway 40 at Jensen, Utah, and U. S. Highway 30 at Green River, Wyo., this structure replaces a comparatively crude prototype built in 1927, rebuilt in 1928, and damaged beyond repair in 1950.

Now cattlemen, who have no other way to move their livestock between adjacent ranges, can be assured that the bridge will be passable.

Deer herds can migrate between Utah and Colorado portions of the Brown's Park range, thus assuring better big game management.

More economical administration of the north and south sections of the Brown's Park area by BLM personnel of grazing Districts 6 and 8 is another benefit.

Director Edward Woozley, BLM, believes the construction is a pattern for future cooperative endeavor.

"Only those who have undertaken projects like this know how much persistence is required to overcome administrative barriers of the participating agencies, even where the desire for a facility is unanimous. The multiple benefits of replacing the destroyed bridge were obvious, yet great patience was required in the face of slow progress. Though each of the interested agencies was willing to participate, one had to assume leadership. We are pround that the Bureau could do so to the apparent satisfaction of all concerned."

The orginal bridge was constructed with 6 wire-rope cables, stretched in a horizontal plane approximately 16 inches apart. Two inch planking was used for the deck on top of the cable fastened with J-bolts to the outside two cables only.

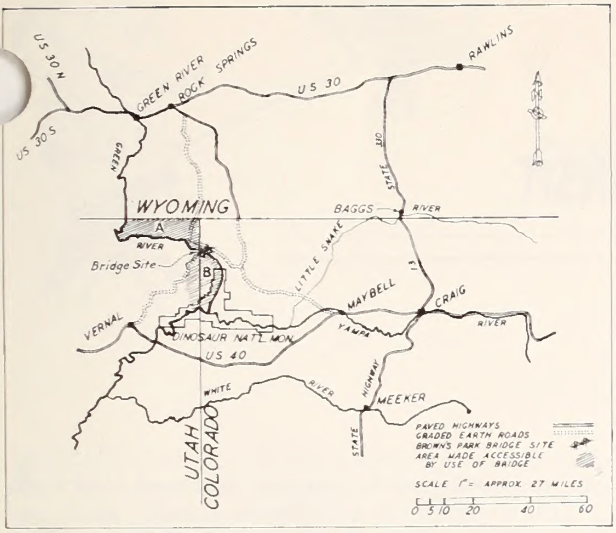
Walter Meyers of Clay Basin, Utah, who assisted with the original construction and reconstruction, recalls the original bridge:

"Construction was begun in 1927 by Stanley Crouse and neighbors. After many trials and tribulations, the bridge was completed during the winter, only to blow over and have to be rebuilt in the spring of 1928. Difficulties encountered during construction included failure of the turnbuckles, breaking of chains attached from cables to blocks used to stretch the cables by horsepower, failure of end supports which were originally railroad rails, and tower failure due to shifting sand in the foundation."

Greater difficulties were found after construction. It was found impossible to keep all cables at uniform tension or correctly spaced under the deck. Wind turned the bridge over on numerous occasions. Frequent mending kept the bridge passable, but the structure finally failed in 1950.

In 1950–51, at the request of interested parties, the Bureau of Land Management made surveys and prepared a rough estimate and plans for reconstructing the bridge along more substantial lines.

Plans called for using the old cables, anchors, north tower, and all salvageable materials. However, any bridge constructed with old materials would not be suitable for public use, and since th



BROWN'S PARK. The three corners area of Utah, Colorado, and Wyoming is the locale of a cooperative bridge-building project coordinated and supervised by BLM. Shaded areas A and B show jurisdictional areas and grazing lands on opposite sides of the river that could not be reached by personnel of Colorado and Utah grazing districts except by long, round-about trips without bridge.

potential Echo Park Reservoir of the Colorado River Storage project would inundate the bridge site, the project was dropped.

In 1953, it appeared that the Echo Park Dam would not be constructed, at least immediately, and interest was again expressed by various agencies and individuals in constructing a new bridge.

The Colorado State Department of Game and Fish and the Utah State Department of Fish and Game were interested in providing access for hunters to isolated areas located on opposite sides of the Green River in order to assure more effective harvesting of surplus big game animals.

In addition to the saving of time and money through easier access for administrative purposes, the Bureau of Land Management needed the bridge to assist in livestock movements and for fire control.

Since the bridge site is situated in Moffat County, Colo., about 1 mile east of the Colorado-Utah border, the Board of Commissioners of Moffat County offered to contribute toward construction of the bridge and to repair and maintain the approach roads.

Commissioners of Daggett County, Utah, also pledged road maintenance.

The Watson Livestock Co., which owns lands on both sides of the river near the bridge site, became the only private contributor.

During September 1953 approximately $10,000 was pledged for the construction and the Bureau made additional surveys and prepared the necessary plans and specifications.

It became evident that a suitable structure would cost nearly double the amount pledged. The major contributors responded by doubling their contributions.

A construction contract was awarded by the Bureau on December 30, 1953, to the Uintah Construction Co., Vernal, Utah, and construction commenced January 26, 1954, at the same site as the old bridge.

It was necessary to tear out the old structure and construct new concrete abutments and anchors. The two main suspension cables were prestressed at the factory to prevent additional sagging after installation. Cables were not delivered until June 19, delaying completion of the bridge until July 23, 1954, at a final cost of $20,107.08.

Costs were distributed as follows:

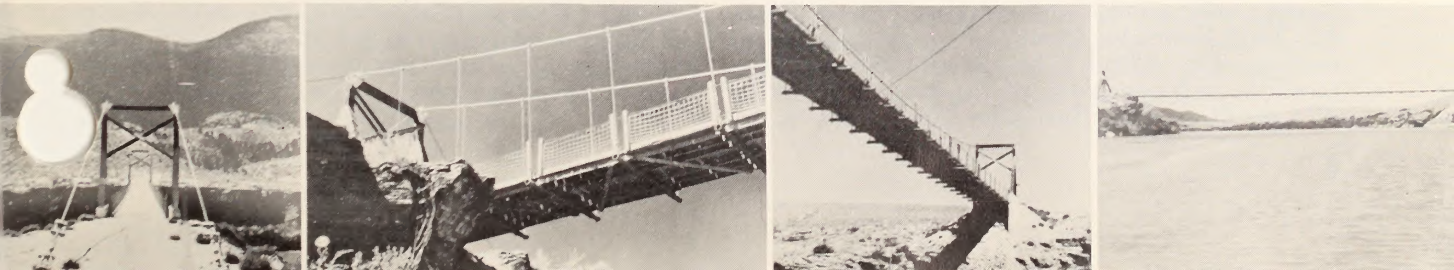
Colorado State Game and Fish Department, $7,773; Moffat County, $6,773; Utah State Fish and Game Department, $3,500; Watson Livestock Co., $900; Colorado District 6 Advisory Board, $600.28; and Utah District 8 Advisory Board, $560.80. Surveying, design, engineering, and supervision contributed by BLM were estimated at $2,257, making the total cost of the project $22,364.08.

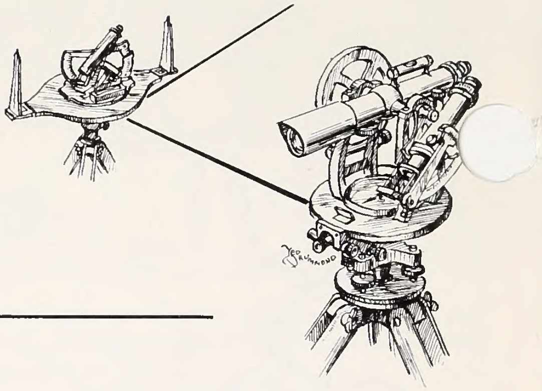
The bridge is 318 feet long, 9 feet 4 inches wide, and is strong enough to hold a maximum load equivalent to 400 sheep or a 3½-ton vehicle.

O. P. DeJulio, Agricultural Engineer, now with the Bureau of Land Management's Area Office at Salt Lake City, supervised the original design of the bridge, contract negotiations, and contacts with cooperating interests. Agricultural Engineer Don Hunter of BLM rendered valuable assistance.

Every contributor is betting he will get his money's worth out of the bridge before Echo Park Reservoir becomes a reality. The project demonstrates once again that many fingers make light work and many purses an easier financial burden for all. **End**

THE NEW BRIDGE. Detail study views of the new suspension bridge built through the cooperative efforts and financing of ranchers, grazing district advisory boards, county interests, the fish and game departments of Utah and Colorado, and BLM.





EVOLUTION OF THE SOLAR TRANSIT

by DONALD B. CLEMENT, ***Cadastral Engineering Officer, BLM***

IN THE different fields of engineering activities, it frequently happens that specialized instrumental equipment and techniques are developed over the years to fit particular needs.

Such was the case with the cadastral engineering work of the Bureau of Land Management and development of the solar transit.

The solar transit is designed for the accurate and rapid determination of the true meridian independently of any reference lines previously established.

The very nature of our cadastral surveys requires such an instrument for the reason that rectangular surveys are projected across country, frequently in virgin territory where no other reference lines are available. Our field parties must be able to determine the true north and south line within close limits of tolerance and to project those lines through timber and underbrush without having to take the time to clear the timber and brush required for a normal back-sight line.

The solar transit is in reality two instruments combined in one. The basic instrument is the ordinary engineer's transit. To that is added a second instrument in the nature of a telescopic solar attachment which operates independently of the basic instrument but places that basic instrument in the true meridian. The solar attachment affords a mechanical solution of the celestial triangle—pole, zenith, sun—resulting in determination of the true meridian.

The modern solar transit evolved over a long period of years.

Back in the early 1830's, deputy surveyors engaged in the survey of the public lands, particularly those in the northern lake region, experienced great difficulty in using the magnetic needle due to the deflection resulting from deposits of magnetic ores. This was particularly troublesome to William A. Burt, a deputy surveyor operating in Michigan and Wisconsin. Being mechanically minded and a student of astronomy, Mr. Burt turned his thoughts to a means of overcoming that difficulty by determination of the meridian independently of the magnetic needle. The result was the Burt solar attachment to the ordinary surveyor's compass in use at that time.

This attachment afforded a direct, rapid, and reasonably accurate determination of the meridian by the sun. Believed to be the first of several styles of solar attachments, it was patented by Mr. Burt in 1836 and was used by him and other deputy surveyors who became interested in his device.

The Burt solar attachment on an open-sight compass was standard equipment in the survey of the public lands for a great many years and, indeed, is used to a certain extent today.

Incidentally, one cannot but admire a man of the caliber of William A. Burt. Born in 1792, he did not have the advantage of formal education such as is available to every young man today, and indeed we read that he had only 3 weeks of form schooling after he reached the age of 9 years. Y he was naturally studious and became an outstanding surveyor, astronomer, and inventor.

Mr. Burt had five sons—John, Austin, Alvin, Wells, and William—all of whom he trained in the art of surveying. The survey records of the Bureau of Land Management reflect that this Burt clan surveyed vast areas in the Upper Peninsula of Michigan, in Wisconsin, and Iowa from about 1830 to about 1855. Presumably, most of the surveys executed by them were made with the Burt solar compass. Retracement of their surveys in recent years with the most modern equipment indicates that the alinement of their surveyed lines compares favorably with that determined by the most precise methods of modern times.

The next significant development in the way of solar apparatus was the telescopic solar attachment for use with an engineer's transit. This was developed by Benjamin H. Smith, a United States surveyor, in Colorado in 1880. The prototype of the modern solar attachment has a higher degree of accuracy and affords the refinement of combining an engineer's transit with telescope as compared with the open-sight compass generally used with the Burt solar attachment.

Unfortunately we do not have available to us a background of information regarding Mr. Smith such as has been published regarding Mr. Burt

(Continued on page 19)

COORDINATED LAND USE PLANNING

by **ROYALE K. PIERSON**, *Range Officer, BLM*

VARIED land status has always been an obstacle to carrying out a complete conservation program on Bureau-administered lands. Land in other ownerships, interspersed with public land, could not be included in conservation plans unless a specific problem existed which was endangering or otherwise preventing proper use of Bureau land.

Several attempts have been made to cope with this problem by cooperation with local soil conservation district or individual range users.

The first effort to draw attention to this problem on a national basis was made by the late Albert Agee, a rancher and a Federal range user of Contact, Nev. At the annual meeting of the National Association of Soil Conservation Districts held in Atlanta, Ga., in 1950, Mr. Agee attempted to obtain passage of a resolution by the Association creating a public lands committee. Also, endorsement of a program for securing the same degree of conservation treatment on public lands that was in progress or private lands in soil conservation districts was sought.

The effort was not successful that year, but at the 1951 meeting of the Association in Oklahoma City, Mr. Agee, together with a group of ranchers from other Western States, succeeded in organizing a temporary public lands committee. This group obtained the adoption of a resolution creating a permanent committee composed of members selected by individual State Soil Conservation District Associations.

At the organization meeting of the temporary committee in Oklahoma City, various plans were proposed and discussed for obtaining financial support for conservation programs on the public lands and other measures to give them such attention as the group believed was needed.

Mr. Agee proposed that one soil conservation district in each of the public land States be selected as a pilot area to try out the formulation of integrated conservation plans which would cover all public lands and all private lands within the district. He suggested that the selection be made jointly by the State Association and the public land agencies. Among other criteria, he insisted that there be no serious range management problems in the district which might present a formidable barrier to cooperative relationships among ranchers and among land-administering agencies. (Mr. Agee was a former Grazing Service employee and thoroughly understood the need for having grazing privileges full adjudicated and other management problems properly resolved before attempting to induce all landowners in the district to follow a single plan.)

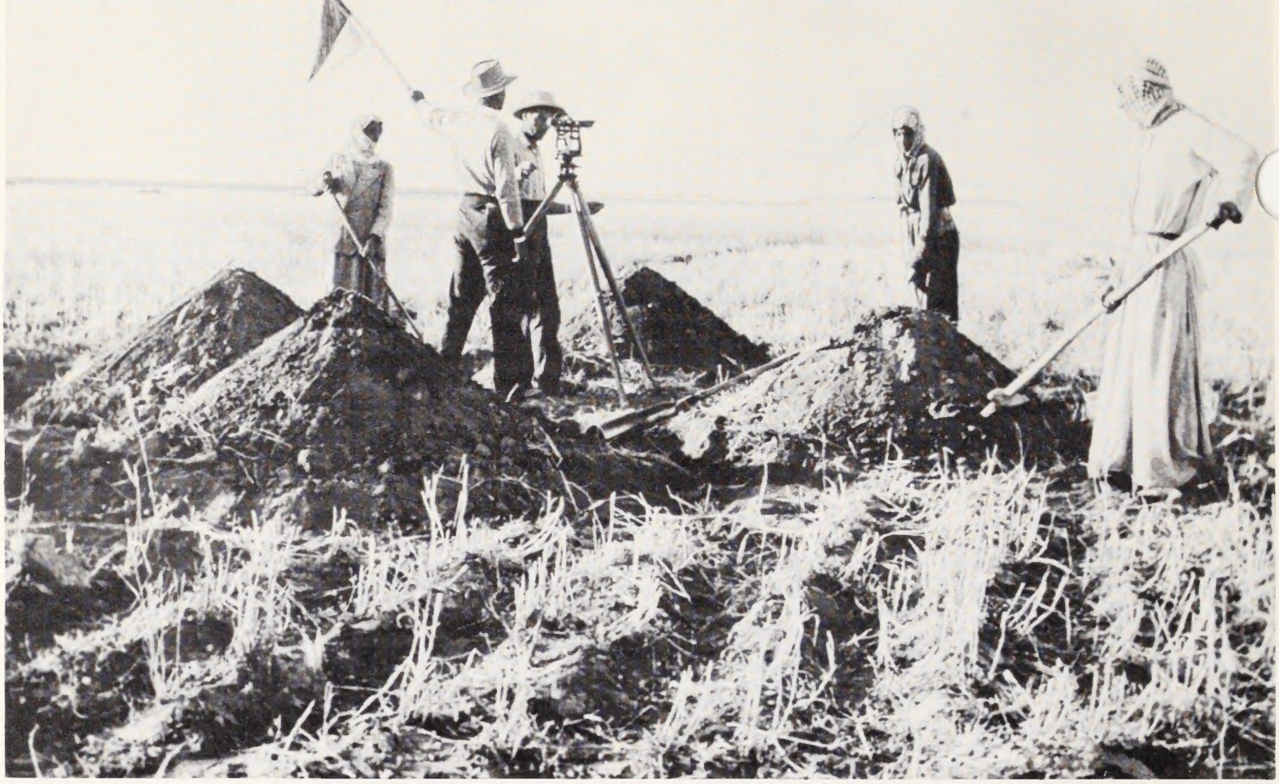
The Bureau, at Mr. Agee's invitation, took steps immediately to aid in the selection of pilot districts in the public land States. Since then one has been selected in each of the 11 Western States having soil conservation district laws, and in South Dakota.

Progress in carrying out the pilot soil conservation district program has varied from State to State, for a number of reasons. One of the most important factors has been the extent of basic information available on range forage inventory, soil types, land classification, and water. A great deal has also depended upon the quality of local leadership. In some States an enthusiastic public lands committeeman has served as a spark plug in bringing the various interested agencies together and in spurring them on to action in conservation planning.

One of the first pilot districts to complete an integrated conservation plan was the Northeast Elko District in Nevada. Back in 1937 and 1938, a cooperative land use survey had been made by a number of the agencies, including the former Grazing Service, which provided most of the needed information as a basis for an integrated plan.

Progress in carrying out the plan in Northeast Elko has been satisfactory due to a combination of circumstances, including the availability of halogeton control funds for reseeding infested ranges. Several lessons in interagency cooperation were learned during the course of preparing the plan and in carrying it out. The major problems in the district were large areas of depleted range and exceptionally low hay production on private ranch properties. Through range re-

(Continued on page 23)



CADASTRAL SURVEY PARTY IN IRAQ. *Earth mounds, called "theyos" in Arabic, are accessories to corner monuments, identifying their type (section or quarter section) and making it easy to find them.*

ANCIENT IRAQ TRIES RECTANGULAR SURVEYING

by CLARK L. GUMM, *Cadastral Engineer, BLM*

(During a recent 2-year assignment in Iraq, on loan from the Bureau of Land Management, the author introduced a rectangular survey system patterned after that of the United States. His article and photographs afford an informative insight into the rudiments of rectangular surveying in Iraq as compared with America 170 years ago.)

ONE OF THE youngest geological areas in the world combines with probably the oldest civilization to make modern-day Iraq unique among nations.

The antiquity of this land, which was just emerging from the head of the Persian Gulf about 4,000 B. C., can be appreciated when it is realized that its history began with the early Sumerians 40 centuries before the time of Christ—just double the 20 centuries that have elapsed since the dawn of Christianity.

Yet today Iraq is in much the same position as the United States following the Revolutionary War when the infant country was confronted with settling vast new areas of its public lands. In early America, the problem was debated at length between advocates of the existing indiscriminate system of location and those favoring a systematic and technically organized survey system. Thomas Jefferson, as chairman of the committee appointed by the Continental Congress to report on the matter, prepared the brief for exponents of planned survey. With slight modifications his proposals became law in 1785.

Thus, in the settlement of its new lands and development of its resources the United States has had the advantage of the rectangular system of surveys. That this system has been phenomenally successful is attested to by its general acceptance in the public land States as having always been with us. Yet at the time of its proposal it was unique and even today is practically unknown and unpracticed except in Canada which has a similar system.

In Iraq, due to the current development program and the new land laws, a period of random settlement similar to that of the United States 170 years ago is coming to an end as large new areas are becoming available to the government. From our experience, it is apparent that the present cadastral survey of Iraq, which is useful only for random settlement, would no more be suitable for development of the vast areas under consideration than the indiscriminate method would have been for the United States.

This problem is particularly important to Iraq since she is attempting to leap across in but a few years the several centuries experience of the world in development and land tenure improvements. These objectives demand that the proper tools be available to technicians for planning, constructing, and operating irrigation and settlement projects. In this respect a properly designed rectangular cadastral survey system can be the "basic tool" for development purposes and then function as the first requirement for a stable land tenure.

The first known cadastral diagram, dating from about 2100 B. C., was found at the ancient city of Telloh in Iraq. It is drawn on a clay tablet and shows the computations of the area made by two different persons. The present cadastral survey system of Iraq was established soon after the British Occupation of the first World War. The system follows closely that of the British Colonies and the survey of India.

The United Nations has defined cadastral surveying as follows: "Cadastral surveys in general create, reestablish, mark, and define boundaries of tracts of land."

Cadastral surveys fall into two main classes. One consists of surveys of tracts already settled, where claim to title is based on cultivation, occupation, or other productive use. Surveys of this type (sometimes referred to as metes and bounds surveys) follow the evidence of cultivation, established land monuments, or boundaries agreed upon by adjoining claimants.

The other main class of survey consists of surveys of areas where the tracts are surveyed prior to settlement.

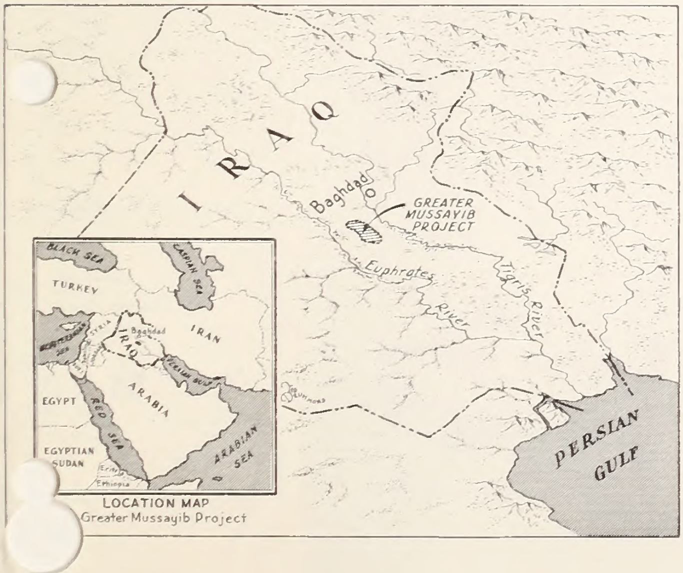
The surveys of Iraq were almost solely those of the first class because until the Miri Sirf (public land) development laws, all titles were originally gained by occupation or exploitation. This type of cadastral survey is the only practical type where surveys have not caught up with settlement. As mentioned, such is the case in most of the world, and in the Original Thirteen Colonies, and a few other States in the United States, where settlement preceded surveys. The major part of the United States, however, is now under the rectangular system of surveys, which is the second type.

The cadastral survey in Iraq has proven satisfactory for the purpose intended, which was to segregate and identify tracts of land not in government ownership. This was and still is being done by plane table and open sight straight edge, using triangulation stations for orientation and control. The method is purely graphic and requires little other than the manual skill of the operators.

The boundaries of the surveyed tracts are seldom monumented, and this lack is undoubtedly

(Continued on page 12)

MAP OF IRAQ. Artist Ted Drummond portrays Iraq with this perspective map, showing location of Greater Mussayib Project.



THE AUTHOR. Clark L. Gumm and driver on the Greater Mussayib Project, showing moving sand dune in background.

BLM'S CADASTRAL ENGINEERS INTRODUCE RECTANGULAR SURVEYS TO LAND THAT WAS ONCE BABYLON

(Continued from page 11)

the greatest shortcoming of these surveys. Without monumentation, the identification of a previously surveyed point is usually beyond the capabilities of anyone other than surveyors. This situation practically eliminates the value of the existing survey for development purposes.

The basic survey unit is the *maquata* which is an irregular figure containing anywhere from 60 to 300,000 acres. This is further subdivided into *kotas* of various sizes and shapes conforming to the actual limits of individual occupation. In the settled areas there can be hundreds of numbered kotas within a maquata. However, in the regions requiring reclamation, most of the land is government land and is still in large parcels. It is on the lands subject to development that the benefits of a rectangular survey are needed.

In areas where the adjudication of claims is still proceeding or title has passed, the existing system should be continued. There is no practical incompatibility between the two cadastral systems, hence the rectangular survey can be fitted into the existing legal and administrative structure.

The rectangular survey system introduced in Iraq is patterned after that of the Bureau of Land Management in the United States with some changes to suit local conditions. Several publications of the Bureau, including the "Manual of Instructions for the Survey of the Public Lands, 1947" and "Standard Field Tables" provided the technical references required. (A schematic diagram is illustrated to show the general plan.)

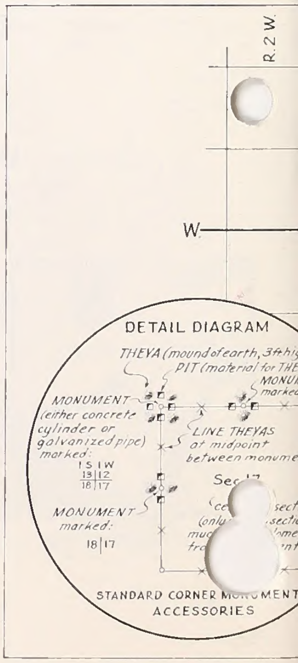
Briefly the system provides for the layout of a basic 10 kilometer grid or township which is further divided into 25 sections of 2 kilometer dimensions. This constitutes the "Development Base Grid." A permanent and substantial monument is set every kilometer in the ground along the section lines. These monuments can be either a 3-foot long concrete cylinder, 5 inches in diameter or a galvanized pipe with flanged end and brass cap, firmly set in ground and marked to show the sections to which they refer. Details are shown in the accompanying diagram. Provisions has been made to allow for excesses or deficiencies due to geodetic factors of the shape of the earth and small operational errors.

Any scientific or technical purpose can be served by the "development grid." Among others, a tight horizontal grid is marked on the ground which provides the finest control for mapping. The monuments can be used as bench marks. Soil and land classifiers can go upon the ground and conduct their examinations knowing their findings are correctly and accurately located on map All engineering investigations for irrigation and drainage can be controlled by the grid.

The success of this planned program of develop-

IRAQI SURVEY FIELD PARTY. Length of shadows denotes early morning as work gets underway at dawn. In summer, work is not practical after 10 a. m.

GENERALIZED DIAGRAM. Shov set up by BLM loanees in Ir detail of a section survey.


R.2 W.
W.
DETAIL DIAGRAM
THEYA (mound of earth, 3ft hi
PIT (material for THE
MONU
marked
MONUMENT (either concrete cylinder or galvanized pipe) marked:
1 S 1 W
13 | 12
18 | 17
LINE THEYAS at midpoint between monume
Sec
MONUMENT marked:
18 | 17
STANDARD CORNER MONUMENT ACCESSORIES

CONTRAST. Land recently cultivated sharply contrasts with the open desert of Iraq in this photograph. Vegetation is principally camel thorn.

ment has been demonstrated on the new Greater Mussayib Project of the Miri Sirf Lands Development Department which should be in operation this year. In 1953 a rectangular cadastral survey was started on this project of 150,000 acres. As the development base grid was completed the maps were turned over to the Irrigation Department which made a paper location of the lateral canals (those delivering water to farms) along *regular lines of subdivision.* This can be done in much of Iraq because of the flatness of the land.

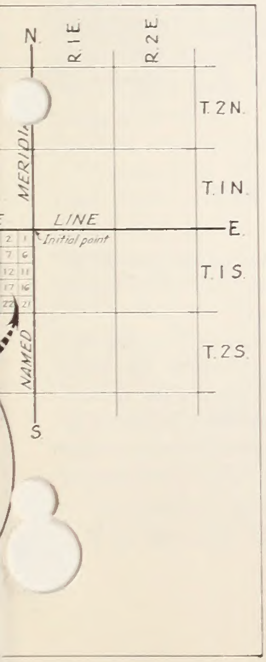
The final locations were returned to the Miri Sirf Land Development Department whose Cadastral Division then located the corners of the individual farm tracts on the ground. As these tract corners also mark the centerlines of the canals and drains, two operations were combined in one since it was not necessary to locate sepa- tely the centerlines of the 1,500 kilometers of teral canals.

It was now possible to issue the official cadas-

(Continued on page 22)

MARKING MONUMENT. These 3-foot, 5-inch diameter concrete monuments, shown here in place, now have identification numbers stamped by dies. Here they are being painted on. A half-inch iron rod reinforces the concrete.

angular system of surveys as
cluding township grid and



SURVEY CAMP. Barren nature of the general area of the Greater Mussayib project is apparent from this photo of first cadastral survey party camp.

active acres

NEW BOOK ON S & MC ENGINEERING

Soil and Water Conservation Engineering by Frevert, Schwab, Edminster, and Barnes has been published for the purpose of providing a professional text book in this field for agricultural engineering students.

As a text book, it should serve the purpose quite adequately, although much of the emphasis seems to be placed on conservation needs of the more humid regions of the United States. The breadth of subject matter covered is quite extensive and, therefore, individual topics of importance to agricultural engineers in practicing their profession are not sufficiently developed to serve as reference material.

About the first third of the book is devoted to the fundamentals of climatology, run-off estimates, soil physics, and related subjects. The subsequent material is especially good in developing an understanding of the nature of soils in relation to erosion. Soil and water relationships are covered in less detail than in other books, however.

In the chapters covering the application of conservation engineering, considerable space is devoted to farm ponds and drainage, reflecting the Middle West experience of three of the authors.

As reference material for BLM conservationists this book would find its greatest value in district offices where engineering assistance is not available and the range conservationist must act independently on problems involving engineering.—R. K. P.

WHY SEALED BIDS?

Departmental Regulation 43 CFR 192.51 authorizes the Bureau of Land Management to offer leases for oil and gas lands within a known geologic structure of a producing field either at public auction or by sealed bid. Yet it is the policy of the Department and BLM to offer competitive leasing by sealed bid rather than by oral or auction bidding.

Director Edward Woozley explains that this policy has been arrived at only after carefully considering auction bidding on a number of occasions and concluding that neither the Government's nor the public's interest would best be served by so doing.

The regulation was enacted for the purpose of enabling the Bureau, should a particular situation require it, to proceed by way of oral bidding. Such an occasion has not arisen since the regulation was enacted in 1946 nor for many years prior thereto, he pointed out. In fact the last sale whe lease was awarded through oral bidding was abo 25 years ago in Cheyenne, Wyo., for certain lands within the Oregon Basin, a producing structure.

The Director gave these cogent reasons why all competitive lease offers have been by sealed bids since that time: Higher bonus payments accrue to the Government since a sealed bid cannot be raised; collusion is minimized; agreements in restraint of bidding are practically nullified; opportunities for making "trades" are minimized; spite bidding is restrained; prospective bidders financially unable to travel can compete with bidders who are more fortunate in this respect if bids can be submitted by mail.

MULTIPLE MINING RULES SET

Regulations for administering the Multiple Mineral Development Act of August 13, 1954 have received final Secretarial approval.

Chief provisions establish a system of multiple-mineral development on the same tracts by permitting Mineral Leasing Act filings, such as oil and gas, on prior claims located under the Mining Act (and vice versa), and set up procedures under which mineral leasing applicants are authorized to publish notice requiring mining claimants to reveal any interests which may be adverse to le sees; also for holding public hearings resulting from such notices.

NEW BOOK ON LANDS

How to Get Land from Uncle Sam, by Harry Kursh. (New York: W. W. Norton & Co., Inc. 219 pp. $2.95). "What is here written will stir new appreciation for the Bureau of Land Management which administers most of the land in the public domain," writes Helen Henley in the *Christian Science Monitor*.

Those in BLM know that Mr. Kursh spent enough time personally interviewing personnel of the Bureau and digging into the complex machinery by which the millions of acres of public domain are administered to acquire the factual know-how for able treatment of the ambitious subject which he attempts.

The preface to the book, written by Irving Senzel of the Lands Staff Office of BLM, affords some insight into the book's worth. Mr. Senzel writes:

"This book is addressed to the largest group of absentee landlords in the world. It deals with the landed estate owned in common by the 160 million people of the United States, most of whom are not fully aware of their property. In popular fashion, it describes the rules which the elected representatives of the people have established for the disposition of their property.

"The public domain, the landed estate of our people, has played a prominent role in the history of the United States. Even today, after more than 150 years of legislation on the subject, the Congress still gives considerable attention to problems relating to the management and disposal of the public domain, which is still a significant segment of the American economy.

"The role of the public domain in American life today, of course, is quite different from its influence in the earlier days of the Republic. The great open frontier, in the geographical sense, is gone. The era of free land in large measure is past. However, opportunities to acquire public lands still exist. This book describes such opportunities and suggests an approach to them.

"A reading of the text will probably yield at least three major conclusions. One is that the remaining public domain is distant from the main concentration of the American people. Opportunities, then, are greater for those living near the public domain than for those who are free to roam at will. Another is that the Federal land administrators do not enjoy the freedom of action usually associated with real estate agents. They cannot buy and sell at will. They are subject to a host of laws, rules, and regulations which they must observe and which they must enforce.

"A third conclusion is that one must find one's opportunity oneself. Official help is available, but the initiative and enterprise remains in the individual."

The author gives grateful credit to Edward Woozley, Director of the Bureau of Land Management and the following members of his Washington staff: Harold R. Hochmuth, Irving Senzel, Lewis Hoffman, Charles Merrill, Michael Giller, Abe Furr, Richard McCormick, Karl S. Landstrom, Don Clement, Walter Horning, Gerald M. Kerr, Byron Denny, and Mrs. Louise Downs.

BLM EXPLAINED TO SCOUTS

(Prepared by the Office of the Area Administrator, Salt Lake City, Utah, the following synopsis of what BLM is and does was furnished to the prize-winning Boy Scouts who represented each of the 12 Boy Scout councils of the Nation on a June 20—July 4, 1955, conservation-in-action tour through Colorado, Utah, Idaho, and Wyoming. The tour was a fitting climax to the highly successful 1954 Conservation Good Turn program in which the Bureau of Land Management played a leading role.)

In 1812, when the United States was a new Nation, it had a problem of immense and unmeasured lands beyond the Appalachians. There were also problems of financing the Government of a new country. An organization was set up to survey and sell lands for the Treasury. So began the oldest Government agency, now the Bureau of Land Management. It has been, and still is, the office of record for the public lands of the Nation.

The Public Domain started to grow when the 13 Original States gave their excess holdings to the Union. Then followed the Louisiana Purchase, Oregon Territory Addition, Texas Annexation (the public lands in Texas itself were retained by the State), and ceding and purchase of lands from Mexico.

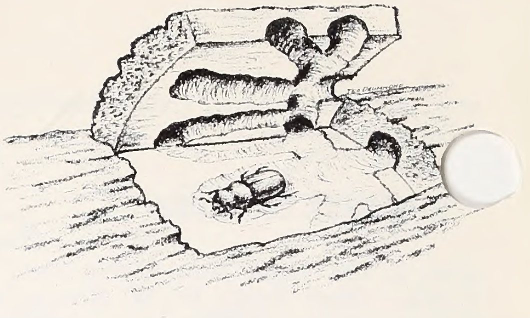
Lands were sold, given to war veterans, and otherwise transferred to private ownership. When Lincoln was President, the Free Homestead Act became law. Under that Act, the bulk of the country west of the Mississippi was settled.

When valuable minerals were discovered, laws were passed to give title to the discoverer and developer of ore bodies. Leases were, and still are, issued to prospect for and develop oil and gas wells. The homestead laws were revised to separate surface and subsurface values so that the title to lands after a certain date included only the surface rights. The mining and leasing laws were recently revised so that hard-rock mining can go on while oil and gas are being developed from lower levels.

There are many land laws. Carrying out the will of the Nation in regard to its public lands is the job of the Bureau of Land Management.

BLM surveyors are still advancing the rectangular system of surveys prescribed by the Continental Congress in 1785. They have now

(Continued on page 21)



BEATING THE BARK BEETLE

by ARCHIE D. CRAFT, *Forester, Idaho State Office, BLM*

IN 1948 and 1949, the timber stands of America's Northern Rockies, known as the Inland Empire, were subjected to heavy winds, causing an excessive amount of blowdown and breakage and creating a favorable condition for insect activity.

From 1949 to 1952, the Spruce Bark Beetle (Dendroctonus engelmanni) increased from a normal population to one of epidemic proportions throughout most of the area, the most serious infestation occurring in the vicinity of the Round Top Ranger Station, which lies approximately 15 miles south of Avery, Idaho.

Approximately 15,000 acres in this area, legally identified as T. 43 N., R. 4 E., are administered by the Bureau of Land Management. A considerable portion of this area is covered with a mixed stand of Engelmann Spruce, Mountain Hemlock, Alpine Fir, Western White Pine, and some lesser species.

The Bureau conducted a small sale of blowdown timber in Section One of the above township and at this time, August 1951, no abnormal beetle population was noted, except in the blowdown timber. However, by the spring of 1953 an additional 5,370,000 board feet of standing spruce had been marked and sold on this same section as a result of the increased beetle attack.

In September of 1952, a 5 percent detection cruise was made over a portion of the area primarily to determine the degree of infestation. The results of this cruise indicated that additional scales should be made. A cruise determines the estimated volume of standing timber in a sample area, usually a chain wide, which is a 66-foot strip across 40 acres.

Following the reorganization of BLM in the spring of 1954, efforts were resumed to salvage the remaining timber in the area. Experience gained from the previous sale indicated that volume determination on a log-scale basis (measuring cut logs by means of board-foot scale stick) would be much more satisfactory than the lump sum sales (estimated value of standing timber) normally made by BLM. The constant reduction in total merchantable volume due to deterioration made the lump-sum method impractical.

It was therefore decided that a 10 percent cruise (2 chain-wide strips across 40 acres) would be made for the purposes of sale layout, appraisal and advertising purposes in order to obtain a more representative sample.

During the course of the field work, it was discovered that the epidemic was not confined to the Little North Fork of the Clearwater River drainage as was originally believed, but also extended into the Lund Creek drainage which lies directly south in the Little North Fork. An examination of the Lund Creek area was made by district, State, area, and Washington personnel. Recognizing that up to 20 percent of the volume and 50 percent or more of the timber value might be lost during the first and second years of beetle infes-

CUTTING. Felling a beetle-infested Engelmann spruce on public domain near Avery, Idaho. Sawyer is employed by successful bidder. *Photos by Robert S. Nobis.*

tation, this group determined that the Bureau hould take emergency steps to have the infested ber surveyed during the remainder of the field son (approximately 6 weeks). This action was necessary to get the infested timber on the market during the early winter months permitting logging operations during the current winter. With this objective, a request was made for additional assistance. Four men from Area I and 2 men from the Washington office were immediately detailed to North Idaho to help complete the field work.

The sale that resulted on November 5 was for 22,155,000 board-feet, of which 13,300,000 board-feet consisted of infested Engelmann Spruce. This is the largest volume ever sold under one contract on the Public Domain. It was sold by oral auction to the Potlatch Forests, Inc., of Lewiston, Idaho, at the appraised price.

The sale was also unusual in that the contract required the actual volume cut and removed by the operator to be scaled by a "bonded scaler" or third party, the scaler to be subject to check by BLM personnel and required to submit regular reports to the Officer in Charge. This method was used for this sale because it appeared that such a procedure would expedite completion of the cutting by allowing the contractor to hire a man whose tour of duty could be tailored to meet his production schedules. The method also relieved the Bureau from the necessity of furnishing a regular employee to perform this work, thus enabling the two permanent employees staffing the Coeur d'Alene office to perform better their full-time forestry function on the estimated one and one-half billion feet of timber on public domain lands in Northern Idaho.

Following are some statistics on the bark beetle salvage sale:

Species	Etimated board feet volume	Value per thousand	Value
	Thousand		
Green and Salvage Spruce	13, 300	$1. 75	$23, 275. 00
Mountain Hemlock	4, 155	3. 00	12, 465. 00
Alpine Fir	3, 920	3. 00	11, 760. 00
Western Larch	620	4. 05	2, 511. 00
White Pine	220	20. 50	4, 532. 00
Douglas Fir	45	4. 05	182. 25
Total	22, 260	--------	54, 725. 25

Computations have been made of the estimated loss already sustained by the Government due to deterioration and the additional amount that would have been lost had the sale not been made.

As of early spring, a total volume of 6,465,000

(Continued on page 21)

ADED DOWNSTREAM. Beetle-infested spruce logs cut from public domain ready for rafting downstream on the St. Joe River to St. Maries, Idaho, where the river flows into Lake Coeur d'Alene. Later, tugs towed smaller rafts of the logs to contractor's mill at Springston, Idaho.

MINERAL SURVEYS ARE DIFFERENT

by **EARL G. HARRINGTON**, *Cadastral Engineering Staff Officer*, **BLM**

ALTHOUGH the major portion of the public lands of the United States has been surveyed under the rectangular system of surveys, we have departed from that system in conducting the survey of private land claims, mining claims, and numerous other types of special surveys authorized by Congress.

The methods employed in surveying and disposing of our mineral lands were actually designed, at least in principle, by the miners. The early discoveries of free gold in the United States were made far in advance of settlement, mainly in the western territories. Mineral deposits in these regions were appropriated and their value extracted under varied local camp or mining district rules, with the tacit approval of, but without any regulations by, the Federal Government.

Finally, with the spread and development of the mining industry, Congress in 1872 enacted legislation not only recognizing the possessory rights of citizens of the United States to the minerals on the public lands, but also providing for their disposition.

Mineral surveys are required most frequently where the deposits occur in ore-bearing rock veins, known as mineral lodes, where the prospector who has made a legal discovery is permitted to stake out a claim of specified dimensions, develop the same to his exclusive use, and, if desired in the protection of his right, may apply for a mineral survey and obtain a patent. All other forms of mineral deposits are known as placers and usually do not require a mineral survey as they are conformed to the public survey, unless they are located on unsurveyed land or the configuration of the mineral deposit is such as to make conformation impractical.

The principal requirements for the actual survey of the mineral claims are contained in Chapter 10 of the Manual of Surveying Instructions, 1947, and may be summarized briefly as follows:

1. In general, the technical instructions for executing mineral surveys are similar to those providing for surveys under the rectangular system. All surveys must close within 0.50 foot in 1,000 feet.

2. Mining claims located after May 10, 1872 are limited to a length of 1,500 feet along the vein of the lode and to a width of 600 feet. The end lines of each claim must be parallel to each other.

3. Connection will be made to all lines of the rectangular system of surveys if the lode claims fall within a surveyed area. All conflicts with previously surveyed mining claims are noted.

4. When a survey is situated in a district where there are no corners of the public land survey and no other monuments within 2 miles, a location monument will be established. The site, when practicable, should be some permanent point giving good visibility from every direction and the site should be so chosen that the permanency of the monument will not be endangered by sno rock or land movements or other natural cau Its position with reference to latitude and longitude should be recorded as accurately as the known data and the instruments used will afford.

5. Corner monuments consist of the following materials:

(a) Tubular iron posts with flaring base, cement core, and brass cap for marking with steel dies.

(b) A stone at least 24 inches long, 6 inches wide and 4 inches thick set 16 inches in the ground with a conical mound of stone 1½ feet high, 2 feet base alongside.

(c) A rock in place.

6. All topographic features of the mining claim and other data that may be required for mapping purposes are noted.

7. Field notes are the written record of the survey. It is essential that this record show the alinement and measurement of all lines surveyed, a description of the topography along the lines, and the monumentation of the field work. The field note record is the basis for the identification of the boundaries of the claim.

8. The plat generally is prepared on a scale of 200 feet to an inch. The plat represents the lines surveyed, established, retraced or resurveyed, showing the direction and length of each of such lines; the relation to the adjoining official surveys; the boundaries, description, and area of the tract of land surveyed; and, as far as practicable,

delineation of the topography of the mining claim, including a representation of the culture d improvements within the limits of such rvey.

There are many thousands of surveyed mining claims scattered over the public domain. Since the law requires that the lode claims shall be referenced to the lines of the public surveys and the placer claims shall conform to the legal subdivisions of the public lands, it is apparent that each surveyed lode claim, although its boundaries are at variance with the lines of the rectangular system of surveys, actually has a definite location with respect to that system. **End**

ACQUIRED LANDS COST $2.2 BILLION

(Continued from page 3)

basis. The General Services Administration is taking steps to provide for periodic reports by agencies so that this objective can be met.

In transmitting the inventory report, Edmund F. Mansure, Administrator, General Services Administration, stated that the data will be used in many ways, not the least of which is to facilitate the disposal of surplus property and thereby increase revenues and decrease expenditures.

In acknowledging receipt of the report, the Senate Committee on Appropriations requested that a second report be compiled as of June 30, 55, to be issued as a Senate Document in January 1956, and that the reporting procedures and compilations be continued as of the end of each fiscal year thereafter.

The committee commented that each agency of the Government might make good use of the inventory, in order to consider well if suitable space or facilities may be already available to the Government before requesting further acquisitions. **End**

EVOLUTION OF THE SOLAR TRANSIT

(Continued from page 8)

He must have been a man of parts, however, to have developed an instrument of this type.

The modern solar transit results largely from development studies conducted by Arthur D. Kidder, formerly Associate Supervisor of Surveys in the General Land Office, in cooperation with leading instrument makers. Mr. Kidder devoted a lifetime to the improvement of techniques and raising the standards of the cadastral engineering profession to a high plane.

In 1910 Mr. Kidder devised the Ephemeris for use of the surveyors of the General Land Office in the operation of the solar transit. That publication has been continued annually since that time; since 1945 it has been prepared by the author.

Although the use of the Burt solar compass spread through the surveying service of the General Land Office beginning shortly after its invention, the use of an independent means of meridian determination was not required by regulations until 1890. Beginning with the Manual of Surveying Instructions issued in that year, the use of the magnetic needle was prohibited except in subdividing and meandering and then only in localities known to be free from local attraction. The Manual of 1894 required that all surveys of the public lands of the United States be made with reference to the true meridian, determined independently of the magnetic meridian.

By use of the solar transit in general daily practice, the true meridian may be determined accurately in 1 or 2 minutes and without reference to any previously established line of azimuth. This is truly an instrument which has expedited the survey of the public lands and has undoubtedly resulted in the saving of millions of dollars to the Federal Government. **End**

SOLAR TRANSIT. Author, Donald B. Clement, inspects solar attachment which distinguishes transits used by BLM cadastral surveyors from usual instrument used by engineers.

SCATTERED TRACTS ON AUCTION BLOCK

(Continued from page 5)

One consequence of the undirected disposal of the public lands is that extensive areas of the less desirable land remained in public ownership. It left, intermingled with areas of patented land, scattered tracts which, because of broken topography, thin soil, or location, were not suited to entry under the Homestead Act, and were not attractive to applicants under other land laws.

The question is raised frequently as to why these scattered tracts remain in public ownership. For the most part, minerals, if present, have been reserved to the United States. But surface resources may be valuable. In most cases, the lands are not suited to general agriculture, but are available for grazing. In some instances, such lands are surrounded by lands owned or controlled by others and are not accessible to the general public.

Nevertheless, the lands have value for surface use. These tracts include, among others, considerable acreages of low-lying, poorly drained soil along watercourses. Such lands, although not suitable for agriculture, have a value for forage production and have come with increased population to possess high values for wildlife propagation. Other tracts have site value or can be utilized for grazing in conjunction with private land.

For the most part, the Bureau of Land Management exercises some control over the use of these scattered tracts. When leased to farmers and livestock men, the lands normally are used in connection with, and in the same way as, the private lands. The development and improvement of the resources on these properties depends quite largely upon potential use of adjoining lands.

Occasional tracts were sold on application of buyers, but traditionally the disposition of these lands has been entirely in response to the demands of the public. The freedom of selection of these lands was restricted only partially by the Taylor Grazing Act, and although their disposal is contingent on a favorable classification, applications normally would be approved. An application would be rejected if it were contrary to the public interest, or if the selection of particular tracts would interfere with established programs for resource improvement, for recreation, or in case certain tracts were essential to the management of adjacent areas of the public range. The classification for a use higher than the production of range forage contemplated among other things a sustained productivity, and normally required noninterference with the use of other public or private lands.

The public sale laws under which the lands may be transferred limit the area that can be purchased. For instance, as much as 760 acres of land that is mountainous or too rough for cultivation is subject to sale if it adjoins private lands. Isolated tracts of land smaller than 1,520 acres in size may be offered for public sale. Normally, the disposition of public lands by public sale requires: an application to purchase; a classification of the la and an appraisal of its sale value; approval of t application; a period of advertising in a local newspaper; allowance of a time for receiving protests and preference bids; approval of the sale and issuance of final patent.

Under the public land laws, an adjoining owner has a right to present a preference bid for any isolated tract land offered for sale. He is required, however, either to meet the offer made by the applicant or to pay a sum three times the appraised price. Where there is more than one preference bidder, the competing bidders may reach an agreement as to the division of the land, or the Bureau of Land Management may make a division.

In order to clear up the intermingled pattern of land ownership, the Bureau is offering for sale all lands in certain localities at public auction. When this procedure is followed, the classification of the land, its appraisal and the advertising of the land for sale can be made prior to the offer of and the acceptance of bids.

Adjoining owners will still have preference rights to bid on land offered. Land classified as having particularly high value for the propagation of wildlife, or which has values for recreation or other public purpose, may be acquired by State or local governments. Public lands required for public programs, such as those lying within the boundaries of national monuments, will not be offered for sale. Lands lying within reserv tions and withdrawals will remain under the jud diction of the administering agency.

As most of the scattered tracts of public land are already leased for grazing purposes, the lessee must be notified and the grazing lease held for cancellation. An agreement must be made with the lessee as to disposition of improvements which will be left upon the land. Here, as in most public sales, the successful purchaser must make arrangements to reimburse the lessee for improvements which have been placed upon the public land in connection with the existing grazing lease.

As a result of the land classification studies in the Missouri River Basin, large areas may be offered for sale. This will be done only after a careful analysis of the land ownership pattern, a determination as to the value of the land for management in connection with the operations of the Bureau or other Federal and State agencies. Land will be checked carefully to determine its availability for disposal and if any other claims or commitments should be considered, including interests of other Federal agencies. The Geological Survey will report on mineral resources involved, if any.

The procedure will simplify for the applicant the process of acquiring public land, and will greatly reduce the time required to make effective an application to purchase. The applicant will know as soon as sealed bids are opened and or bids are made at the time of sale whether or not his bid is successful. When more than one pref- nce right bid results in conflict for the purchase a tract, such preference right bidders will be given a 30-day period to agree on division of land. If no conflicts develop, the sale will be made promptly, the cash payment will be received, and the application for patent will go forward immediately.

It is hoped that by calling attention to the availability of certain tracts of land through legal notices published in local newspapers and posted in the land offices, and through press releases, sufficient interest will be stimulated to insure the disposal of all land within a given area.

Local groups have expressed a desire to cooperate and the Bureau of Land Management hopes the program can be thoroughly tested in the summer of 1955. In Stanley County, S. Dak., approximately 125 tracts totaling 19,600 acres have been earmarked for disposal, and the first sale was scheduled for June 23 in Philip, S. Dak., with 12,219 acres in 94 separate tracts going on the auction block.

The sale of these lands will return a modest sum to the United States Treasury, will relieve the Bureau of Land Management of the management function on these scattered tracts, will make the user responsible for the protection and improvement of resources and will place these lands on local and State tax rolls. As a result, the program to conserve and manage resources on the ublic lands can be concentrated in areas of conguous holdings. Also the lands will receive the same interest in conservation and development given to the adjoining private lands. **End**

BEATING THE BARK BEETLE

(Continued from page 17)

board feet of spruce had been totally lost. At the appraised price of $4 per thousand (the contract price of green spruce in Section One) this amounted to $31,678.50. In addition, due to the decrease in quality, the price was reduced from $4.90 per thousand to $1.75 per thousand, or a difference of $3.15 per thousand. When applied to the 13,300 thousand most recently sold, this amounts to $41,895, or a total loss of about $73,500.

It is further estimated that by the end of 1956 all the merchantable spruce on the area will have lost all value as saw timber. It is therefore reasonable to assume that the monetary saving to the Government as a result of this single sale was the contract price of the spruce, or $23,275. Projected for other sales, such savings represent the kind of dollars and cents conservation that makes management of the public domain forests a paying proposition in the face of what might otherwise be a total loss. **End**

BLM EXPLAINED TO SCOUTS

(Continued from page 15)

reached the last remaining and hardly accessible areas of the West. Under this system of surveys, a tract of land of 160 acres can be needle-pointed on a wall map of the Nation by a land description of a few words and numbers.

Lands men are passing on the merits of the many applications for public lands for homesteads, desert claims, small tract residential and building tracts, and other lands.

Mineral examiners check for the discovery of valuable ore before patents are issued for mining claims.

The Bureau considers and, after approval, processes requests for withdrawal of lands for public purposes.

Land offices process applications for land leases, patents, and maintain records. They are still as busy as when the phrase, "Doing a Land Office Business," was invented.

Great cattle and sheep industries arose, and put pressure on the grazing lands, while the farmer plowed all the good and some of the poorer lands. The lands which remain are the driest parts of the Western States. The rainfall averages only about one-half that of Colorado Springs, the first step of the Caravan.

Grazing is regulated in 60 grazing districts established under the Taylor Grazing Act of 1934 and on other scattered public lands. Developmental and remedial works are carried on. Springs and wells are developed. Small reservoirs and fences are built for the good of livestock. A big program of range betterment through wise use, reseeding, protective works against erosion, and spreading of waters to increase vegetation is under way. In fact, all the things are being done which are sometimes done on individual farms to protect soil and use water.

Almost 200 million acres of land exclusive of Alaska, an area equal to one-tenth of the total land surface of the 48 States, are managed for grazing and forestry by the Bureau. The States visited by the Caravan have the following acreages of public land (in round numbers): Colorado 8 million, Utah 25 million, Idaho 13 million, Montana 7 million, Wyoming 16 million acres. The sum of these is 69 million acres. These are the low lands which lie between the mountains. They are the rough and smooth foothill and valley lands, except that the settlers have generally picked the best of the lands.

The immense extent of these lands gives them their value. They produce annually in fees, leases, sales, and royalties an income many times as great as the cost of maintaining the Bureau of Land Management. In the last 5 years the income has averaged in excess of $58½ million per year.

We welcome you to the public lands—workshop of the Bureau of Land Management! **End**

IRAQ TRIES RECTANGULAR SURVEYS

(Continued from page 13)

tral plat upon which the individual farm tracts are lotted, numbered, and areas given. All land disposals and records will be based on this plat.

While the foregoing operations were taking place, a land classifier, using the development base grid, was making his investigations which will be considered before actual distribution of the land is made.

As professional and subprofessional personnel is almost entirely lacking, it is necessary to train them. One of the considerations in designing the rectangular survey was to achieve simplicity so as to conserve these precious skills. Trained instrument men are used only for surveying township and section lines in the establishment of the development base grid. The lower subdivisions can be executed by less trained personnel using only narrow steel tapes to locate the tract corners along the section lines. Corners within the section are established at "line of sight" intersections between the monumented tract corners of the section lines.

The end result of the rectangular survey is an official plat upon which land disposals can be made. However, it will also provide an invaluable development tool, largely lessen the land use problems created by random settlement, and furnish a clearly identifiable survey on the ground.

There are a number of large areas in Iraq that will come under irrigaton and development when the development plans are realized. If they were surveyed under the rectangular system as soon as possible, the development base grid could then be available for the additional planning and investigation that will be necessary before settlement. It is estimated that this survey will cost about 3 cents an acre, a negligible amount when compare to the cost of development.

The introduction of rectangular cadastral surveying has proved a timely adjunct to Iraq's steady return along the road which may lead back to agrarian prominence.

The irrigation zone in Iraq is a region running roughly 300 miles north from the present head of the Persian Gulf and averaging 100 miles wide. The Tigres River flows through the Eastern part and the Euphrates River marks the western boundary. These two rivers are among the greatest in the world and the area between them in the Delta corresponds to the old kingdom of Babylon. This land is unbelievably flat. Baghdad, which is nearly 200 miles airline from the Gulf is only 100 feet above sea level. The largest part of the population lives in this zone, and here in the last 30 years, the character, economy and social structure of the country are being remade.

While programs of the classification of the tribes and direction of their energies into agrarian channels together with development of irrigation were essential, it was realized that no permanent or stable economy could result without a solution to the chaotic land ownership and tenure patte confronting the country. The applicable l laws were those of the Ottoman land code of 18 Under the Ottoman Code several categories of land ownership were recognized, among them private lands, *Mulk;* lands under religious control, *Waqf.* Also a public domain or land registry office, *Tapu,* was established which officially recognized titles by confirming and registering claims. The Tapus still exist but principally as offices of records, performing substantially the same function as county clerks in the United States.

In 1932, after a study and report by a foreign land tenure expert, a land settlement law and a Lazma law, which made provision for the settlement of tribes in areas to be designated by the government, were placed in operation. In 1938 thes laws were slightly modified and remain today as the basis under which titles are confirmed or granted.

Under the settlement laws, all right to and in land, such as rights-of-way, water rights, ownership of improvements or resources, or other privileges are adjudicated and authenticated by publication in the official government gazette, comparable to America's Federal Register. After a protest period has elapsed, or if a judicial review has not been requested, the decisions of the land settlement department become final, forming the bases for adjudication or documentary proof of ownership, occupation and use, improvements o even local customs.

By the end of 1953 the land settlement depa ment had adjudicated 70 percent of all Iraq, excluding the desert regions within the Syrian Desert. Over 60 percent of the adjudicated land was found to be Miri Sirf. Thus with the deserts, *Matruka* (land dedicated to public purposes such as roads, threshing floors, et cetera), and future Miri Sirf lands, the Government will be established as the owner of 80 percent of the country—a holding nearly equal to the combined areas of New Mexico and Colorado.

It is fundamental in any program of land use and development, that the legal and use status of the land be known. The fact that such information has been difficult to obtain, requiring time-consuming effort, has not impressed officials of the need of a catalog of lands readily available for development and management use. Nevertheless, a section was set up in the cadastral division of the Miri Sirf department, and this section immediately set about preparing such a catalog.

This inventory was being compiled from the official adjudication of the land settlement department and court decisions affecting ownership of lands. The data are abstracted on card files showing the type of tenure, ownership of each piece of adjudicated land, area, amount of cultivation, and how watered. The material, covering some 15 o the 21 years' operation of land settlement laws,

PLACING MONUMENT. Cornermen prepare hole for placing permanent monument in Greater Mussayib project survey under direction of Fawzy S. Khalisy, a graduate of Utah State Agricultural College, Logan, Utah, and now chief of the Cadastral Division, Miri Sirf Land Development Dept., Iraq.

available in the Cadastral Division of the Miri Sirf Department. Work on the other 6 years has been proceeding and probably has been completed. It should provide a basis for statistical research, a quick and easy record of land ownership and use.

Even if no irrigation development takes place, the survey will still be available as a cadastral survey for the disposal of the land with little or no additional field work. The large desert areas present a special problem. There is little demand for surveys there at present and only a few triangulation stations are found in these areas which constitute nearly 50 percent of the country. This situation could well change in future years. Consideration might be given to surveying these areas under the rectangular system. The town lines only could be surveyed at first. This would result in not more than 1 point in each township being as much as 5 kilometers from a monumented and marked point. It would be a simple matter to subdivide any township into sections when needed. The accuracy of such a survey would compare with the third order triangulation of Iraq.

Thus, new methods in cadastral engineering may help to return a nation that developed one of the most remarkable irrigation systems in world history to something of its former agricultural greatness. The land between the Tigris and Euphrates Rivers that was once a vast granary of the ancient world may bloom again. **End**

COORDINATED LAND-USE PLANNING

(Continued from page 9)

seeding and improved irrigation water utilization, these deficiencies are gradually being overcome.

In the Gunnison-Tomichi Pilot Soil Conservation District in Colorado, one of the major problems was an adjustment in range use affecting national forest, Federal range, and privately owned range land. Through the joint efforts of all concerned these adjustments were made more rapidly than under ordinary circumstances, as this was necessary to pave the way for an integrated conservation plan. This district also had a serious problem in lack of adequate winter deer range. The State fish and game department is contributing to the program in improving winter range areas by reseeding. Here, also, lessons are being learned in securing the cooperation of various agencies and private landowners.

The foregoing examples are indicative of the progress currently being made and whether or not the program moves uniformly in all States will not necessarily detract from the overall benefits.

One of the outstanding results obtained to date is the focusing of national attention on the conservation needs of the public lands.

The program provided a means for concerted attacks on problems involving land in various ownerships which otherwise may drag along for many years without solution. The program has also served as a proving ground for various conservation practices carried out jointly by several agencies. Already the pattern of cooperation developed on the pilot districts is spreading to other areas.

The whole effort can be looked upon as a facilitating device for speeding up the rehabilitation and improvement of the public lands. **End**

U. S. GOVERNMENT PRINTING OFFICE : 1955 O—347383

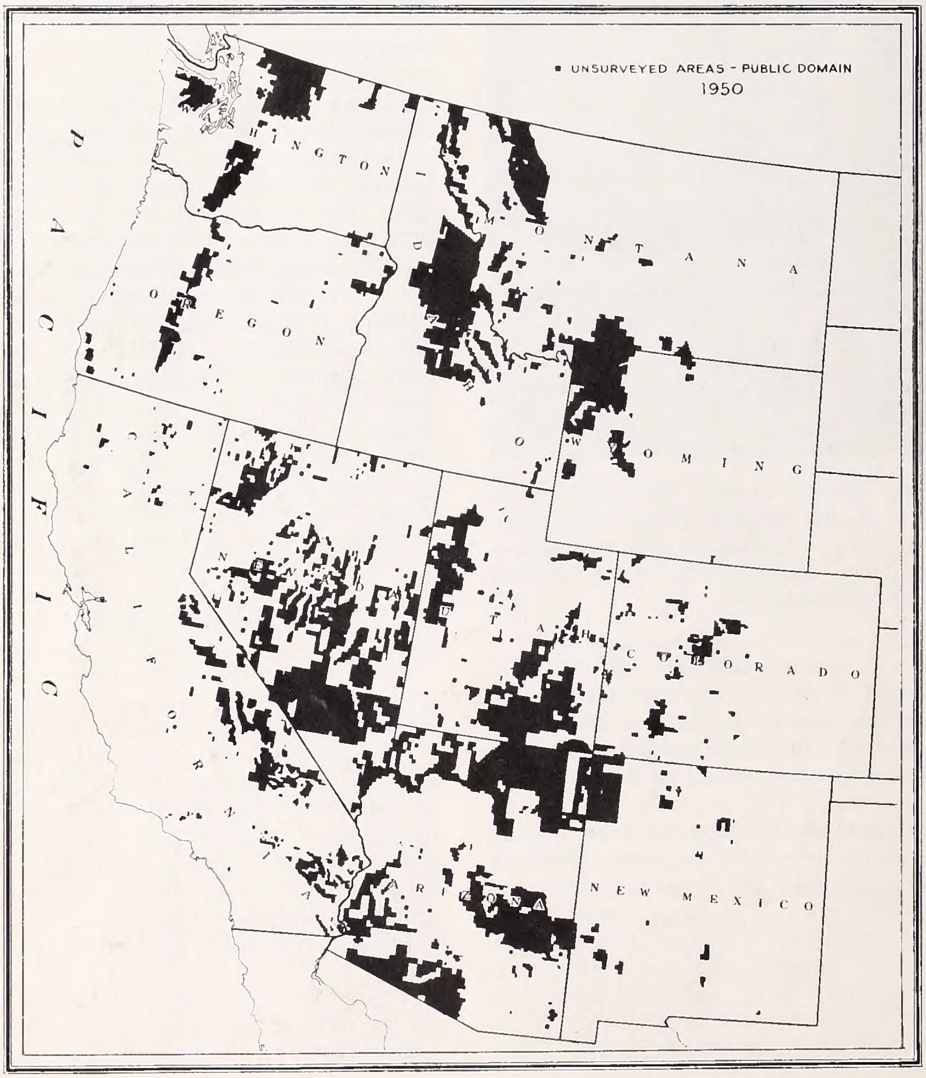
For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. - Price 15 cents (single copy).
Subscription price 60 cents a year, 15 cents additional for foreign mailing

SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON 25, D. C.

OFFICIAL BUSINESS

PENALTY FOR PRIVATE USE TO AVOID
PAYMENT OF POSTAGE, $300
(GPO)

UNSURVEYED AREAS OF U. S. REDUCED TO 100 MILLION ACRES



ONLY ONE-THIRTEENTH UNSURVEYED. The solid black areas in the above map denote unsurveyed lands in the United States chiefly in inaccessible desert and mountainous areas, much of which will never require survey, e. g., national forest lands in high mountainous areas. The unsurveyed lands total an even 100 million acres. Sounds like a lot until compared with the 1,327,009,288 acres already surveyed.